

Remarks/Arguments

Applicants have carefully considered the office action and submit the foregoing amendments and the following response. Claims 1-192 have been canceled and new claims 193-221 have been added. The new claims add no new matter, and are believed to be in condition for allowance for the following reasons.

Rejection under 35 U.S.C. §103 over Clark alone or in combination with Chesser

The examiner maintained the rejection of claims 127-192 under 35 U.S.C. §103(a) as unpatentable over Clark et al (5,658,860) alone, or in combination with Chesser et al (6,403,537).

Response

New claims 193-221 are directed to a method of providing **extreme pressure lubrication** of drilling equipment during drilling operations. The examiner has not established a case of *prima facie* obviousness of new claims 193-221 over Clark, alone, or in view of Chesser for the following reasons.

-Friction reduction vs. Extreme Pressure (EP) Lubrication

Several types of lubrication are required during drilling operations. Two types provide (a) friction reduction at metal surfaces, and (b) extreme pressure lubrication.

Friction reduction involves the use of friction reducing additives to reduce the coefficient of friction at metal surfaces of drilling equipment during drilling operations, which promote efficiency when drilling operations involve pressures of about 60 rpm and loads of about 150 in-lb or less. Friction reducers may be relatively low in viscosity, and are **not** designed to react with the metal surface of equipment to produce a coherent lubricating film.

Extreme pressure lubrication protects drilling equipment at higher torque and loads. Extreme pressure lubricants are designed to **react with** the metal surfaces of drilling equipment to provide a coherent lubricating film effective to **reduce the occurrence of metal-to-metal contact and seizure** when higher pressures and loads are encountered during drilling operations.

Evidence of the foregoing is found in the fact that two different tests are used to evaluate these types of lubricant additives:

-The Two Different Lubrication Tests

Exhibit A is a “Model 212 EP/Lubricity Tester Instruction Manual.” A “Lubricity Test” is found in Section 4 of Exhibit A (p. 11-14). An “Extreme Pressure (EP) Test” begins at p. 15.

(a) The Lubricity Test

The effectiveness of a lubricant as a friction reducer is evaluated using a “Lubricity Test.” In a Lubricity Test: the RPM’s are set at 60 rpm with the torque meter at “0,” and 150 inch-pounds (16.95 N-m) of torque is applied for 3 to 5 minutes. The torque reading is recorded. Nos. 2-4, Exhibit A, p. 14. The coefficient of friction is determined by dividing the recorded torque reading by 100. *Id.*, No. 1 under “Sample Lubricity Calculations.”

Clark’s Example 1 reflects a lubricity test. Referring to Clark, the rheostat is adjusted to “give 60 rpm with a load of 150 in-lb.” Clark, col. 7, ll. 22-23. And, Clark gives the resulting “lubricity coefficient” for the various lubricants. Clark, col. 7, Table I.

(b) Extreme Pressure (EP) Lubricant Test

The effectiveness of an extreme pressure lubricant is evaluated by an Extreme Pressure Test, or an EP test. An EP test determines the **lubricity film strength** of the film produced when an extreme pressure lubricant **reacts with** metal surfaces. Specifically, an EP test “is used to determine the *load or pressure the lubricant will hold without a complete breakdown of film strength*. This is termed a *PASS*. Breakdown of lubrication film allows metal-to-metal contact, which causes galling and is termed a *SIEZURE*.” Exhibit A, p. 18 (emphasis added).

In the EP test, the torque/RPM meter is at 1000 ± 100 RPM. Without applying a load, the machine is operated at 1000 ± 50 for about 3 minutes or until a zero reading stabilizes. *Id.* The test ring, test block, and block holder are inserted in the fluid and the torque is increased at a rate of 5 inch-pounds (.565 N-m) to determine the lubricity film strength. *Id.* The torque may be increased until a seizure occurs if the maximum lubricity film strength is to be determined. *Id.* The procedure can be repeated at reduced torque levels until a pass is achieved. *Id.*

An EP Test evaluating the claimed extreme pressure lubricant is reported in Applicant’s Example 1. Example 1 states that a “drilling fluid sample was conditioned with the lubricant at various concentrations. . . . and **extreme pressure lubricity testing [was] conducted**. The results are given below in Table I.” Specification, p. 10, ¶[0032] (emphasis added). As seen in

the Tables, the applied torque readings were **400 in/lb** (initial) and **250 in/lb** (aged). Table II, “Extreme Pressure Lubricity Test Data,” Specification, p. 12 (emphasis added). The lubricity coefficient was measured only for Examples 3 and 5. In contrast, the “film strength, psi” was measured for all of the examples, and is recorded in Applicant’s Table II under “Extreme Pressure Lubricity Test Data.”

-The examiner has not established a case of *prima facie* obviousness of the claimed extreme pressure lubricants

The new claims clearly are directed to “a method of providing **extreme pressure lubrication** of drilling equipment during drilling operations.” Claim 1, emphasis added. The new claims also continue to specify that the “insoluble fatty acid soap particles” **react with the metal** to form “a substantially continuous lubricating film providing improved lubricity as reflected in **an increase in lubricating film strength** compared to a control **during extreme pressure testing.**” Claim 1.

In order to establish that the new claims are obvious, the examiner must establish that the new claims are directed merely to “the **predictable use of prior art elements according to their established functions.**” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. _____, 127 S.Ct. 1727, 82 U.S.P.Q.2d 1385, 1396 (U.S. 2007) (emphasis added). The Federal Circuit recently reaffirmed that “a flexible TSM test remains the **primary guarantor against a non-statutory hindsight analysis.**” *Ortho-McNeil Pharmaceutical, Inc. v. Mylan Laboratories, Inc.*, et al., slip. op. 2007-1223, p. 11 (Fed. Cir. March 31, 2008), citing *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

The examiner cannot meet the flexible TSM test, and cannot establish that the claims are directed merely to the predictable use of prior art elements according to their established functions.

The examiner cannot point to any teaching or suggestion in Clark or elsewhere to use Clark’s friction reduction additives as insoluble particulate extreme pressure lubricants effective to provide extreme pressure lubrication. Nor can the examiner point to a teaching or suggestion

in Clark or elsewhere that Clark's apparently fluid friction reduction additives would be effective to provide extreme pressure lubrication during drilling operations.¹

The examiner cannot point to a teaching or suggestion in Clark or elsewhere that Clark's apparently fluid friction reducers would **"react . . . with one or more metal surfaces of drilling equipment in contact with the drilling fluid system."** The examiner cannot point to a teaching or suggestion in Clark or elsewhere that Clark's apparently fluid friction reducers would produce the claimed **"lubricated drilling equipment comprising one or more metal surface comprising a substantially continuous lubricating film providing improved lubricity, as reflected in an increase in lubricating film strength compared to a control during extreme pressure testing."** Claim 1. The examiner certainly cannot point to a teaching or suggestion in Clark or elsewhere that Clark's apparently fluid friction reducers could produce **"an increase of 25% or more in lubricating film strength, measured in psi, compared to a control during extreme pressure testing."** Claims 194, 198, 203, 212, and claims depending therefrom.

If the examiner maintains the rejection over Clark, the examiner is essentially contending that Clark's fatty acid derivatives **inherently** act as extreme pressure lubricants in Clark. "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be recognized by persons of ordinary skill.'" [Citations omitted.] *In re Robertson*, 49 U.S.P.Q.2d 1949, 1951 (Fed. Cir. 1999). Inherency "may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Id.*, citations omitted. "[A] retrospective view of inherency is not a substitute for some teaching or suggestion supporting an obviousness rejection." *In re Rijckaert*, 9 F.3d 1531, 1533-34, 28 U.S.P.Q.2d 1955, 1957 (Fed. Cir. 1998).

The examiner cannot establish that the missing descriptive matter is necessarily present in Clark. Nor can the examiner establish that the missing descriptive matter would be recognized by persons of ordinary skill in the art, for all of the reasons discussed above.

¹ As Applicant previously pointed out, Clark's natural fatty acids are described in Clark is "as" the oil phase. Clark, col. 5, l. 14.

For all of the foregoing reasons, the examiner cannot establish a case of *prima facie* obviousness of the new claims over Clark in view of Chesser. Applicant respectfully requests that the new claims be allowed.

-Claim 202-210 and 218-220

Claims 202-210 also specify that the drilling fluid comprises polymers comprising acrylamide monomers. The examiner cannot establish a case of *prima facie* obviousness of claims 202-210 or claims 218-220 over Clark in view of Chesser for all of the foregoing reasons and for the following reasons.

As explained during the telephone interview, the typical fatty acid soaps used in drilling fluids comprise multivalent metals, or metals having a valence of greater than 1. Drilling fluids comprising acrylamide polymers and multivalent fatty acid soaps experience undesirable viscosification at high temperatures. *See also* specification, ¶ [0010]. The claims solve this problem by using insoluble fatty acid soap particles comprising metals having a valence of 1. Claim 202.

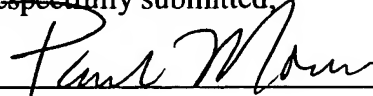
The examiner cannot point to a teaching or suggestion of the foregoing problem addressed by claims 202-210 and 218-220 in Clark, Chesser, or elsewhere. The examiner cannot point to a teaching or suggestion of the solution to the problem reflected in claims 202-210 and 218-220 in Clark, Chesser, or elsewhere. Nor can the examiner point to a teaching or suggestion that the particulate lower valence fatty acid salts would (a) maintain effective and properties and gel strengths to maintain effective fluid loss control properties, and (b) “react . . . with one or more metal surfaces of drilling equipment” to produce the claimed lubricating film to provide “improved lubricity, as reflected in an increase in lubricating film strength compared to a control during extreme pressure testing.” Claim 202. The examiner certainly cannot point to a teaching or suggestion that the claimed lubricating film would produce “improved lubricity . . . demonstrated by an increase of 25% or more in lubricating film strength, measured in psi, compared to a control during extreme pressure testing.” Claim 203.

Applicant respectfully requests that claims 202-210 and 218-200 be allowed for these additional reasons.

CONCLUSION

For all of the foregoing reasons, Appellant respectfully requests allowance of all of the pending claims. The Commissioner is hereby authorized to charge any fees in connection with this paper, or to credit any overpayment, to Deposit Account No. 02-0429 (154-28553), maintained by Baker Hughes Incorporated

Respectfully submitted,

A handwritten signature in cursive script, appearing to read "Paula Morris", is written over a horizontal line.

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